Persistent Classical Swine Fever Virus Infection in Pigs

Uttenthal, Åse; Lohse, Louise; Bruun, Thomas; Nielsen, Jens

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UTTENTHAL, ÅSE[1]; LOHSE, LOUISE[1]; RASMUSSEN, THOMAS BRUUN[1]; NIELSEN, JENS[1]

VET-DTU[1]

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For the pestivirus Bovine viral diarrhea virus (BVDV) persistent infection (PI) in new born calves is well documented. PI calves are recognized as the main route of spreading and maintaining BVDV infections in cattle populations. In pigs, persistent Classical swine fever virus (CSFV) infection is known but the importance and occurrence of PI piglets is unknown and a discussion. One of the most obvious differences between cows and pigs is that is that cows gives birth to 1-2 calves whereas the sow gives birth to 10-20 piglets. In cases of twin calving, both are usually either PI or non-PI. In swine, however, a litter of piglets may contain mummified fetuses, PI piglets, antibody positive piglets and normal litter mates. The diagnostic methods may give the correct answer.

To study persistent CSFV infection 4 sows were infected by intranasal inoculation using CSFV Lithuania 2009 (100 000 TCID50 per sow) between day 50-60 of gestation. The sows showed only minor clinical symptoms including few days of slight fever and inappetance. CSFV nucleic acid was detected in all 4 sows in serum and/or fecal samples between PID 7-15. At farrowing the sows had high titers of antibodies towards CSFV and were virus nucleic acid negative. The 4 sows gave birth to in total 66 piglets. Thirty-six were live piglets and 30 were stillborn or mummified fetuses.

Blood samples were collected from all live piglets on a weekly basis to follow their level of nucleic acids by quantitative real-time PCR and the level of antibodies in serum. The experiment was ended 33-37 days post partum. Some piglets were euthanized earlier due to welfare reasons, however, 42% of the piglets were still alive at until the end of the experiment.

Some of the piglets had very high virus levels in serum indicating high viral loads (down to Ct 16); as previously seen in piglets infected at 1 week of age (Uttenthal et al, 2008, 7th ESVV Pestivirus symposium, Uppsala). Most piglets had high levels of antibodies as well, suggested to represent a combination of maternally derived antibodies and active immunity.

The piglets could roughly be divided into 3 groups:

A. Possible persistent infection (approx 25%) having high virus levels in serum for several weeks. Some of these piglets showed clinical symptoms such as depression, CNS disturbances and discoloration.

B. Transient CSFV infection of very short duration (about 30%): The pigs were born virus and antibody negative, but seroconverted shortly after ingestion of colostrum. Not all piglets were shown to be viremic but as blood was only collected weekly they may have had a few days of un-noticed viremia. These piglets were eventually infected by the PI littermates but protected from clinical disease and prolonged viremia by the high level of passively acquired antibodies.

C. Severely affected piglets that died within the first week after birth (about 45%). These pigs may be infected in utero or just after birth. Their status need to be defined.

The course of infection and the interpretation of diagnostic tools for determination of PI in pigs will be presented and discussed.

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